

**REMARKS/ARGUMENTS**

Applicant thanks the Examiner for his careful review of this application. Claims 1, 2, 4, 7-8, 10-14, 17, 18, and 20 have been rejected. Applicants respectfully request reconsideration of the application in view of the following remarks submitted in support thereof.

**Rejections under 35 U.S.C. § 103**

Claims 1, 2, 4, 7-8, 10-14, 17, 18 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,974,544 to Jeffries et al. (Jeffries) in view of U.S. Patent No. 6,138,176 to McDonald et al. (McDonald). As will be fully explained below, the combination of Jeffries in view of McDonald does not raise a *prima facie* case of obviousness against independent claims 1, 7, 12 and 17. Furthermore, the combination of these references would not have resulted in a method and an apparatus that include all of the features specified in independent claims 1, 7, 12, and 17.

The Examiner asserts that Jeffries discloses accumulating a plurality of commands in a queue, examining the commands in the queue to be like commands and examining the like commands to determine whether they are contiguous. The Examiner acknowledges that Jeffries does not teach each read and write command to include a command data block (CDB) and scatter gather list (SGL). However, the Examiner asserts that McDonald discloses that each read and write commands includes CDB and SGL and that one skilled in the art would be motivated to Jeffries with McDonald.

Claim 1 of the claimed invention teaches accumulating a plurality of commands in a queue wherein the plurality commands including a CDB, and a SGL.

Also, the accumulated commands include contiguous as well as non-contiguous commands. Then, the accumulated commands are examined for like commands, and the like commands corresponding to contiguous files, are combined to form one command.

Jeffries teaches a disk controller for a disk drive array which maintains two representations of all drive defects (Abstract) so that data may be recovered. Jeffries further discloses maintaining related sequences of operations together so the correct order of operations is preserved. Jeffries also requires about buffering incoming requests which are adjacent to the last n requests (Column 7, lines 53-57).

McDonald discloses a RAID system for a personal computer without the need for disk drives based on disk drive interfaces (Column 2, lines 10-12). According to McDonald the RAID system includes an array controller card which controls an array of disk drives. In McDonald the array controller card is equipped with an automated coprocessor and a microcontroller. The controller card processes multiple I/O requests without interrupting the host computer.

Considering the first reference, it is respectfully submitted that independent claim 1 is not obvious in view of Jeffries. Firstly, the Examiner asserts that Jeffries teaches accumulating a plurality of commands in a queue while a first command is being processed by the storage medium. Applicants respectfully traverse the Examiner's characterization in this regard because the portion of the reference relied upon by the Examiner (Column 12, lines 24-28) does not disclose all of the features of Applicants' independent claim 1. In fact, the claim 1 teaches accumulating a plurality of commands in queue and each of the command includes a CDB and SGL. As the Examiner acknowledged Jeffries does not teach each command including a CDB and SGL. As such, Jeffries does not teach the claimed invention. Moreover, in the

claimed invention, the plurality of commands are accumulated in the queue in order to combine like commands into one command. In contrast, Jeffries expressly states that each disk drive completes a request prior to starting the next, which shows that commands are not combined (Column 12 lines 28-29) i.e. performs sequential processing. Furthermore, Jeffries states that if all accesses are purely random, the controller will almost never do a lookahead read (Column 7, lines 61-63). This in fact is teaching away from the claimed invention in which all the incoming commands are accumulated in a queue.

In support of the obviousness rejection, the Examiner noted that Jeffries teaches the concept of examining the plurality of commands in the queue for like commands. Applicants respectfully submit the Examiner's interpretation to be incorrect because the portion of the reference relied upon by the Examiner (Column 5, lines 7-13) does not disclose examining commands for like commands. In fact, the portion cited by the Examiner teaches that, all operation requests are fragmented down to "atomic" i.e. one-cycle operations. In order to ensure that the atomic relations stay in sequence, and that a sequence stays unbroken, if it needs to be, the system uses "fence" markers in the queue, to fence in a block of tasks. These markers are used as limits on the permissible queue management operations, with rules that ensure related sequences of atomic operations are kept together (Column 5, lines 7-13). In Jeffries, the related sequences of atomic operations are the order of the operations and are not like commands as in the claimed invention. For example, in Jeffries one cycle of read operation may be followed by one cycle of write operation so long as the sequence of the operations are maintained.

The Examiner further asserts that, Jeffries teaches examining the plurality of commands in the queue while the first command is being processed, the examining

further including, checking if any of the plurality of commands are like commands. Applicants submit that Jeffries does not teach this. As implied by the Examiner, if the read ahead strategy disclosed in Jeffries is used to combine the commands, then if a read request that comes in, which is not adjacent to the any of the last  $n$  requests, it will not be buffered. For example, if a read request comes in at position  $n+2$  then, according to Jeffries, that command will not be buffered. Therefore, in Jeffries, the only reads that may be combined are the contiguous ones, which defeats the purpose of using the CDB and the SGL. For example, if one read comes in at position  $n$  and the next read comes in at position  $n+5$ , then according to Jeffries the  $n+5$  read may not be buffered. Subsequently, if an  $n + 3$  and  $n + 4$  read comes in, Jeffries is forced to disregard the  $n + 3$  and  $n + 4$  because these reads are not adjacent to prior reads.

In contrast, in the claimed invention all the incoming commands are queued. Then, the commands in the queues are examined for like commands. After that like commands that are contiguous will be combined. Independent claim 1, as amended, specifies that the plurality of commands in the queue include both contiguous as well as non-contiguous commands. If we consider the same example above, in the claimed invention, if one read comes in at position  $n$  and the next read comes in at  $n+2$  both reads will be placed in a queue. Subsequently, when  $n + 3$ , and  $n + 4$  come in these reads will be combined with  $n + 2$ , to form a combined read. Jeffries is incapable of performing this operation.

To establish *prima facie* case of obviousness of the claimed invention, all the claim limitations, as combined, must be taught or suggested by the prior art and there must be some suggestion or motivation, either in the references or in the knowledge generally available to one having ordinary skill in the art, to combine the references in the manner proposed. As discussed above, Jeffries does not teach or suggest features

of the claimed invention. As will be explained below, the Examiner has not established *prima facie* case of obviousness against the claimed subject matter because one skilled in the art would not have combined Jeffries and McDonald in the manner proposed by the examiner.

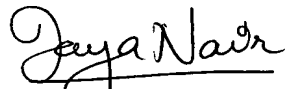
McDonald teaches a RAID system for a PC. The RAID system includes a controller card which controls an array of ATA disk drives. The controller card includes an array of automated disk drive controllers, each of which controls one respective disk drive. Even though the McDonald reference mentions a CDB, the reference does not teach or suggest combining commands. In McDonald, the device driver passes the I/O request in the general form of a CDB plus scatter list (Column 9, lines 40-42). Moreover, according to McDonald, the microcontroller stores sequences of controller commands in drive-specific queues within the RAM and dispatches the controller commands in sequential order to corresponding automated controllers (Column 10, lines 5-9). This passing mention of CDB and SGL cannot reasonably be attributed to providing the requisite motivation to combine McDonald with Jeffries, especially since McDonald teaches dispatching commands from the queue in sequential order. Applicants submit that there would not have been any motivation for one having ordinary skill in the art to combine McDonald with Jeffries.

Accordingly, for at least the above-stated reasons, Applicants submit that amended independent claim 1 is patentable under 35 U.S.C § 103(a) over Jeffries in view of McDonald. Claims 2, and 4-6, each of which depend from amended claim 1, are likewise patentable under 35 U.S.C. § 103(a) over Jeffries in view of McDonald. Chisholm and Row et al. does nothing to cure the deficiencies discussed above. Therefore claims 5 and 6 are patentable under 35 U.S.C. § 103(a) for same reasons stated above. Similarly, claim 7 include the features of claim 1, therefore, at least for

the reasons stated above the amended independent claim 7 is patentable under 35 U.S.C. § 103(a) over Jeffries in view of McDonald. Claims 8, 10 and 11, each of which depend from amended claim 7 are likewise patentable under 35 U.S.C. § 103(a). Claim 12 includes the feature of a driver queue, which is configured to receive read and write commands of an operating system, and the read and write commands in the driver queue include contiguous as well as non-contiguous commands. Therefore, at least for the same reasons stated above, with respect to claim 1, claim 12 is patentable under 35 U.S.C. § 103(a) over Jeffries in view of McDonald. Dependent claims 13, 14 and 16 depend from independent claim 12. Chisholm et al. (U.S. Patent No. 5,802,546) does nothing to cure any of the deficiencies discussed above with respect to Jeffries and McDonald. Therefore, dependent claims 13, 14 and 16 are patentable under 35 U.S.C. § 103(a). Likewise, independent claim 17 include features of claim 1, therefore at least for the reasons stated above, claim 17 is patentable under 35 U.S.C. § 103(a) over Jeffries in view of McDonald. Claims 18 and 20 depend from amended claim 17 are likewise patentable over Jeffries.

In view of the foregoing, Applicants respectfully submit that all of the pending claims are in condition for allowance. A notice of allowance is respectfully requested. In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 749-6900 x6926. If any additional fees are due in connection with the filing of this paper, then the Commissioner is authorized to charge such fees to Deposit Account No. 50-0805 (Order No. ADAPP206). A copy of the transmittal is enclosed for this purpose.

Respectfully submitted,  
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A handwritten signature in cursive script that reads "Jaya Nair". The signature is written in dark ink and is positioned above the printed name.

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